



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,288	09/16/2003	Masafumi Kubota	60188-652	9822
7590 06/06/2005				
Jack Q. Lever, Jr. McDERMOTT, WILL & EMERY 600 Thirteenth Street, N.W. Washington, DC 20005-3096		EXAMINER DANG, PHUC T		
		ART UNIT 2818		

DATE MAILED: 06/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/662,288	Applicant(s) KUBOTA ET AL.	
	Examiner PHUC T DANG	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed on May 5, 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-37 is/are allowed.
- 6) ☒ Claim(s) 13-20, 38 and 41-44 is/are rejected.
- 7) ☒ Claim(s) 39 and 40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on September 16, 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>031405 & 042905</u> . | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2818

DETAILED ACTION

Request for continuation (RCE)

1. Applicant's RCE filed on May 5, 2005 has been acknowledged and considered.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. The office acknowledges receipt of the following items from the applicant:

Information Disclosure Statement (IDS) filed on March 14, 2005 and April 29, 2005.

Specification

4. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

5. Claim 17 is objected to because of the following reasons:

In claim 17, line 2, a term "ccrium" should replace by -- cerium --.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2818

6. Claims 13, 15-16, 18, 38, 41 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagano et al., hereinafter "Nagano" (U.S. Publication No. US2003/0175998 A1) in view of Kitagawa et al., hereinafter "Kitagawa" (U.S. Patent No. 5,187,116).

Regarding claim 13, Nagano discloses a method for forming a semiconductor device, comprising the steps of:

a) forming an insulating film (16, Fig. 2A) comprising silicon on a substrate (10, Fig. 2A);

b) forming a high dielectric insulating film (17, Fig. 2B) on the insulating film (16, Fig. 2B); and

c) irradiating a light onto the substrate having the high dielectric insulating film [[0065]-[0067] page 4].

Nagano discloses all the features of the claimed invention as discussed above, but does not disclose a step of irradiating a light onto the substrate for reducing a crystal defect of the high dielectric insulating film.

Kitagawa, however, discloses a step of irradiating a light onto the substrate for reducing a crystal defect of the high dielectric insulating film [col. 3, lines 6-13].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to modify the above discussed teaching of Nagano as taught by Kitagawa for a purpose of controlling the doping of impurities in the high dielectric insulating film.

Regarding claim 38, claim 38 is rejected similar to claim 13 except for a step of forming a high dielectric insulating film (17, Fig. 2B) on a lower capacitor electrode (15, Fig. 2B) and

Art Unit: 2818

forming an upper capacitor electrode (18, Fig. 2B) on the high dielectric insulating film (17, Fig. 2B) after step b), wherein the high dielectric insulating film is a capacitor insulating film [[0066]-[0067] page 4].

Regarding claim 15, 18 and 41, Nagano discloses the substrate is heated from 100 to 500°C by a heating source other than the light during step c) [[0080] page 4].

Regarding claims 16 and 44, Kitagawa discloses the light has a wavelength of 0.4 μm or less [col. 6, lines 53-64].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to modify the above discussed teaching of Nagano as taught by Kitagawa for a purpose of maintaining the doping of impurities on the surface of the substrate.

7. Claims 14, 17, 19-20 and 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagano and Kitagawa in view of Furukawa et al., hereinafter "Furukawa" (U.S. Publication No. U.S.2005/0077548 A1).

Regarding claims 14, 17, 19-20 and 42-43, Furukawa discloses the insulating film contains nitrogen [[0054] page 4] and the high dielectric insulating film contains at least of hafnium, zirconium, lanthanum, cerium, praseodymium, neodymium. Yttrium and aluminum [[0059] page 4] and a partial pressure of an oxygen gas or an oxygen compound gas is controlled and the atmosphere used including a nitrogen gas or an inert gas [[0059]-[0060] page 4].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to modify the above discussed teaching of Nagano and Kitagawa as taught

Art Unit: 2818

by Furukawa for a purpose of minimizing the possibility of the information of an undesirable oxide can occur.

Allowable Subject Matter

8. Claims 21-37 would be allowed.

The following is a statement of reason for the indication of allowable subject matter:

Claims 21-37 are considered allowable since the prior art of record and the considered pertinent to the applicant's disclosure does not teach or suggest the claimed invention having a step of irradiating a light onto the substrate having the high dielectric insulating film and the source and drain region, so as to reduce a crystal defect of the high dielectric insulating film as cited in claim 21 and a step of removing a gate insulating film and a gate electrode by removing a part of the high dielectric insulating film and the conductive film after step c) as cited in claim 30.

Claims 39-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

None of the prior art made of record does not disclose the lower capacitor electrode is formed in the substrate as cited in claim 39.

Claim 40 is depend on claim 39, it also would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

Art Unit: 2818

Conclusion

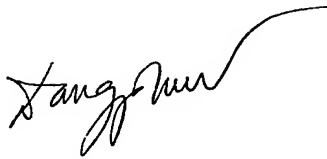
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and After Final communications.

11. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang

P D



Primary Examiner

Art Unit 2818